Vol. 2 No. 4

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Notes and short scientific papers relating to the systematics of cultivated plants, and to their history in cultivation or to the literature pertaining to such topics, will be considered for publication to the extent that the limited space of the publication permits. Line illustrations to accompany such papers are invited. Authors of more than two pages of print will receive in recompense, 15 copies of the issue in which their contribution appears. No proof will be submitted to the author and copy is considered in final form as received. Extracted reprints without change in pagination will be provided at cost [approximately $1.75 per page per 100 copies].

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# The Cultivated Alliums II[1]

Harold E. Moore, Jr.

The Rhizirideum or rhizomatous alliums take their name from the name of the subdivision of the genus Allium, Section Rhizirideum G. Don ex Koch, to which they are usually referred botanically. This section has been variously circumscribed but here contains only those species having a prominent rhizome, poorly developed bulbs, and no nectaries in the septs of the ovary. Even so it is not uniform as a perusal of the following key to the cultivated species will indicate.

1. Perianth segments 10-15 mm. long, papery, persistent about the capsule in fruit; stamen-filaments about half as long as the perianth-segments; stigma trifid (fig. 36, Bd, Be).
   2. Umbel nodding in bud and in flower; leaves glaucous; bulb-tunic membranous. . . . . A. insubricum
   2. Umbel nodding in bud, erect in flower; leaves green; bulb-tunic fibrous-netted. . . . . A. narcissiflorum
1. Perianth segments 3.5-11 mm. long, withering and exposing the capsule in fruit; stamen-filaments 2/3-2 times as long as the perianth-segments (fig. 36, Ad; fig. 37, Af, Be).
   3. Stamen-filaments united half their length or more in a tube (fig. 36 Ad); bulbs very slender, densely clustered on a slender rhizome with thick roots (fig. 36, Aa).
      4. Stamen-filaments included; flowers blue-violet; bulb-tunics membranous. . . . . A. Farreri
      4. Stamen-filaments exserted; flowers rose-lilac; bulb-tunics fibrous-netted. . . . . A. Przewalskianum
   3. Stamen-filaments not or only very shortly united (fig. 37, Af, Be).
      5. Bulb-tunics fibrous-netted (fig. 37, Ab).
         6. Perianth-segments 9-11 mm. long; stamens about 1/2 as long as perianth; capsule ovate, widest near base; leaves somewhat fistulose, rounded below. . . . . A. ramosum
         6. Perianth-segments 4-5 mm. long; stamens almost equalling the perianth; capsule obovate, widest near apex; leaves solid, keeled below. . . . . A. tuberosum
      5. Bulb-tunics membranous (fig. 37, Bb).
         7. Perianth-segments acuminate, 8-13 mm. long; bulbs usually solitary or a few in a single line at the tip of a very stout Iris-like rhizome.

[1]For the introductory article of this series, see "Baileya" 2: 103-113, 1954.

8. Stamens and style exserted; stigma capitate; capsule longer than broad. . . . . A. validum

8. Stamens and style included; stigma 3-lobed; capsule broader than long. . . . . A. brevistylum

7. Perianth-segments obtuse or only acute, 3.5-6 mm. long; bulbs usually paired or clustered.

9. Stamen-filaments 2/3 as long as the perianth; style included, or barely exserted; flowers white; leaves thread-like or semicylindric; bulbs densely cæspitose on a slender rhizome with thick roots.

10. Umbel hemispherical, with few nodding flowers, the pedicels almost equal and 1 1/2-2(-3) times as long as the perianth; scape 5-25 cm. high; leaves thread-like. . . . . A. tenuissimum

10. Umbel denser with usually many flowers on unequal pedicels 3-7 times as long as the perianth; scape 20-40 cm. high; leaves semicylindric. . . . . A. anisopodium

9. Stamen-filaments nearly as long to twice as long as the perianth; flowers pink, yellow or white (but then the style exserted); leaves various; bulbs paired or loosely clustered on a stout rhizome, the roots slender.

11. Leaves linear, mostly more than 2 mm. wide, flat or keeled, the margins usually smooth; flowers lavender-pink, rose, or more rarely whitish, but then the stamen-filaments strongly exserted.

12. Stamens included; leaves keeled. . . . . A. angulosum

12. Stamens exserted; leaves flat.

13. Stamen-filaments 1 1/2-2 times as long as the perianth-segments, the inner twice as broad as the outer and usually bidentate at the base (fig. 37, Be). . . . . A. nutans

13. Stamen-filaments slightly more than 1 1/2 times as long as the perianth-segments, the inner 1 1/2 times as broad as the outer and entire at the base. . . . . A. senescens

11. Leaves thread-like to linear, mostly less than 2 mm. wide, semicylindric or flat, the margins usually minutely roughened; flowers white, yellowish or rose; stamen-filaments about equalling or slightly exceeding the perianth.

14. Flowers rose-violet; style included. . . . . A. rubens

14. Flowers white or yellowish, sometimes flushed with pink; style exserted.

15. Flowers white; leaves flat. . . . . A. denudatum

15. Flowers yellowish, sometimes flushed with pink; leaves semicylindric.

16. Leaves nearly thread-like, 0.5-0.75 mm. wide; perianth 3-4 mm. long, the segments oblong-lanceolate or oblong; pedicels 2-3(-4) times as long as the perianth. . . . . A. flavescens

16. Leaves 0.75-2(-4) mm. wide; perianth 4-5 mm. long, the segments oblong-ovate or broadly elliptic; pedicels 1 1/2-2 times as long as the perianth. . . . . A. Stellerianum

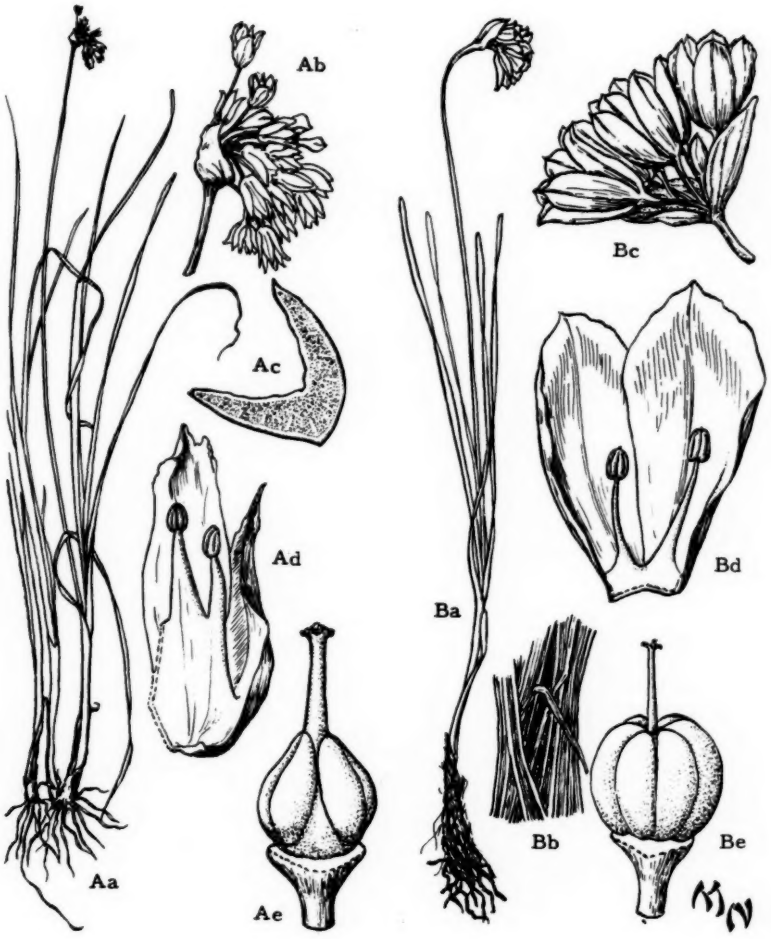


Fig. 36. A, Allium Farreri: Aa, habit x 1/5; Ab, umbel x 1; Ac, leaf in cross-section x 6; Ad, perianth-segments with stamens x 6; Ae, gynoecium x 8. B, Allium narcissiflorum: Ba, habit x 1/4; Bb, portion of fibrous bulb-tunic x 8; Bc, umbel x 1; Bd, perianth-segments with stamens x 3; Be, gynoecium x 4.

The rhizomatous alliums generally make satisfactory plants for the rock-garden, perennial garden or border or for an occasional mass-effect in informal planting. The nature of growth is effective in producing a dense to loose clump. Instead of withering before or shortly after flowering as is usual with the bulbous species, the leaves are retained throughout the growing period. Being of a good green or blue-green, they enhance the garden even without flowers. Many of the species are rather coarse and tall, but some, in particular A. anisopodium, A. denudatum, A. Farreri, and forms of A. senescens, have short leaves and scapes that make them suitable for the rock-garden.

Probably the most ornamental of the Rhizirideum alliums are two species from Italy, A. narcissiflorum Villars (A. pedemontanum Willdenow) (fig. 36, B) and A. insubricum Boissier & Reuter. They differ considerably from the remainder of the Rhizirideum section in a number of characters. Hermann has proposed that they be given independent status in the section Narkissoprason F. Hermann. Although Allium insubricum is sometimes considered a variety of A. narcissiflorum, the differences noted in the key are important ones and seem sufficient to justify maintaining the two species apart.

Another pair of species, for which the sectional name Butomissa (Salisbury) Stearn has recently been suggested, is marked by the fibrous-netted bulb-tunics and bell-shaped or star-like white flowers. The correct names for these species are Allium ramosum L. (A. odorum L., A. tartaricum L. f. [tataricum]) (fig. 37, A) and A. tuberosum Rottler ex Sprengel (A. uliginosum G. Don). Mr. W. T. Stearn, now at the British Museum (Natural History), has discussed the complicated problem of their identity in "Herbertia" 11: 227-235 (1944) [1946]. Both species have been grown under the name Allium odorum although, strictly speaking, this name is a synonym of A. ramosum. The latter is native in central Asia and flowers early, generally in June or July. Allium tuberosum flowers in August or later, comes from southeastern Asia and is cultivated as a potherb and salad plant in the Orient. Known as Chinese Chives (Kiu ts'ai), it is an Asiatic counterpart of the European Chives.

From China come Allium Farreri Stearn (fig. 36, A) and Allium Przewalskianum Regel. The former is often grown as A. tibeticum or as "A. sp. from Tibet." True A. tibeticum, however, does not appear to be in cultivation. The deeply colored violet or blue-violet flowers of A. Farreri usually nod until the capsules begin to ripen, when they become erect. Allium Przewalskianum has a pin-cushion of more numerous rose-lilac or deep lavender flowers from a shorter scape. In neither species do the stems exceed 3 dm.

Another species having much the same habit and similarly suitable for the rock-garden is the little-grown Allium anisopodium Ledebour, a native of Siberia and China. The very slender, almost

Fig. 37. A, Allium ramosum: Aa, habit x 1/6; Ab, rhizome and bulb x 4/5; Ac, umbel x 3/5; Ad, leaf in cross-section x 2; Ae, gynoecium x 4; Af, perianth-segments and stamens x 4. B, Allium nutans: Ba, habit x 1/6; Bb, rhizome and bulb x 2/5; Bc, umbel x 3/5; Bd, leaf in cross-section x 2; Be, perianth segments and stamens x 3; Bf, gynoecium x 4.

thread-like leaves and white or faintly pink flowers distinguish it. A similar species, A. tenuissimum L., is sometimes grown but is rarely seen in the United States.

Two rather coarse species from the mountains of the western United States, A. brevistylum S. Watson and A. validum S. Watson, are occasionally grown in gardens. They are characterized by the very sharply pointed perianth-segments and unusually stout rhizome. Still a third species of similar habit, A. Gooddingii Ownbey, occurs in Arizona and a fourth, A. eurotophilum Wiggins, in the mountains of lower California. The last two have not yet been listed in cultivation but would make attractive additions to horticulture.

Most frequently cultivated are a number of species that may be considered as forming a section by themselves, Section Orthoprason F. Hermann. Native for the most part from western Europe to Siberia, they are variable and difficult to separate into discrete taxa. All of them are satisfactory garden plants and some, such as A. denudatum Redouté (A. albidum Fischer ex Besser), A. flavescens Besser (A. ammophilum Heuffel), A. rubens Schrader ex Willdenow, and A. Stellerianum Willdenow, as well as low forms of A. senescens L., are adapted to the rock-garden. Allium angulosum L., A. nutans L. (fig. 37, B) and most phases of A. senescens are taller species with broadish leaves and scapes as much as 6 dm. high. The white, yellowish, or pink to rose flowers are numerous and attractive.

It was noted in the first article of this series, "Baileya" 2, no. 3 (1954) that Allium senescens is found under many names. Most of them are erroneously applied but some are strict synonyms. In nature the species occurs from western Europe to Mongolia and Manchuria. Vvedensky, who wrote the treatment of Allium in Komarov's flora of Russia, noted four races that blend in their characteristics. The European race, sometimes distinguished as A. senescens var. calcareum (Wallroth) Hylander (A. fallax Roemer & Schultes, A. montanum F. W. Schmidt), has narrow, erect, green leaves (2-)3(-4) mm. wide, a two-edged but not winged scape and oblong-lanceolate, slightly attenuate inner perianth-segments. The erroneous name A. montanum var. petræum is also occasionally used for this phase. From the Far East comes another form, A. senescens var. glaucum (Schrader) Regel, with long, spiralling, often glaucous leaves, a scape usually winged above, and ovate perianth-segments. Typical Allium senescens is robust with short, falcately curved leaves 5-10 mm. wide, a scape often winged above, and oblong-lanceolate perianth-segments. Its center of distribution is in the Transbaikal region of Russia. A fourth phase, not designated by name, and perhaps not cultivated, comes from the Altai-Sayan and is stockier, with short leaves and generally ovate, rose-violet perianth-segments.

In the garden, these forms are so mixed that it is difficult to distinguish them and some of them approach Allium nutans. To the latter species is attributed an unusually complex breeding behavior although the existing confusion leaves room for doubt as to whether the plants were correctly identified. Until Allium senescens is understood in the wild, it is hardly possible to expect clarity in treatments of the plants grown in our gardens. The extreme phases are strikingly different but when all is considered they cannot be aligned in an orderly arrangement. The better clones of A. senescens and A. nutans, however, will certainly continue to be grown regardless of the names by which they are known.

## BIBLIOGRAPHY IN PROGRESS

During recent months, Miss Sandra Shepherd - a Cornell student working part time for the Bailey Hortorium - has been active collecting, collating, and compiling data for a "Bibliography of Current Horticultural Periodicals." Original plans called for publishing this as a supplement to this issue of "Baileya." The quantity of material assembled by Miss Shepherd is so great as to require either a substantial reduction in the scope of the projected bibliography, or a deferment in publication date until March. After a consideration of all aspects, the second choice has been taken.

This bibliography is to be more extensive than any known to exist. Horticulture is interpreted broadly to include plants grown for ornament, for food exclusive of forage, and for economic usage other than timber or forest-products. A periodical is likewise defined broadly, to include those publications from horticultural organizations that are Proceedings, Yearbooks, and Newsletters, as well as the better-known monthly and quarterly serials. American household and agricultural magazines having garden sections will not be included. It has not been found practical to limit horticultural organizations to those of amateur or professional interests, hence those serving trade and commercial interests are likewise included. Furthermore, to make this index representative of the horticultural literature, it will be international in scope. The currently published periodicals of every country are included in so far as they can be located.

Entries will be arranged alphabetically under their country of origin. Translated or transliterated titles will be provided for those not in English. A subject index will be included for those periodicals relating to single genera, groups of genera, or cultural groups (as roses, orchids, succulents, aquatics, etc.). Baileya subscribers will receive a free copy as a part of their 1955 subscription. Non-subscribers may purchase copies separately at a price to be determined on publication.

## Sources of Native Temperate-American Plants

A year ago there appeared in "Baileya" a listing of sources of House and Foliage plants. In keeping with the plan to advise readers of sources of the less commonly grown plants, this issue provides sources of native American plants. In providing the sources given below, some introductory notes are in order.

Some dealers are renowned as specializing in native plants (as Barclay, Barr, Johnson, Payne, Robbins, Rose, Vicks, etc.) while others supplement their listings with items of general garden interest without regard to their nativity. Some seedsmen include native plant material in their catalogues without always indicating whether the seed comes from native material or from cultivation (as Rex Pearce, Henry Saier, George Park, etc.) while others offer only seed from native sources and often of restricted area (as Burns, or Mrs. Cisler). Generally, dealers do not state whether their material is dug and shipped from the wild or if it is nursery-grown. Omitted from the listing below are those dealers who specialize almost exclusively in forest-tree seeds, although many of these are of native kinds and collected from the wild, and cactus specialists whose material may largely be native but too restricted in scope for this subject. Seeds of many woody species native to eastern North America are available from Mr. F. W. Schumacher, P. O. Box 131, Jamaica Plain 30, Mass., although generally collected from cultivated material.

The enumeration below does not pretend to be complete as concerns the nursery that may carry a few native plants in its catalogue, but the effort has been made to include all known commercial sources that specialize in native material. Botanical gardens are omitted, since their seed distributions are usually on an exchange basis. In this regard it is significant that botanical gardens and arboreta of the United States, unlike those of Canada and of Europe, do not generally maintain seed lists and inventories for exchange purposes (the Morton Arboretum and Highland Park of Rochester, New York, are notable exceptions). If there are omissions, in the list that follows, of specialists offering seeds or plants of native plants for sale, the Bailey Hortorium would appreciate being advised accordingly since the list has been prepared from its catalogue file.

Dealers in native plant material (listed alphabetically by states)[1]:

*Milo Kibbe, Rte. 2, Eureka Springs, Ark. [Ozark wildflowers]
*Mrs. Elsie W. Cisler, 1777 Morena Blvd., San Diego 10, Calif. [seeds of southern California plants, wholesale]

[1]Sources whose names are preceded by an asterisk (*) are firms that specialize in native plants.

*Theodore Payne, 2969-2999 Los Feliz Blvd., Los Angeles 39, Calif. [seeds and plants of California wildflowers]
*O. Kenneth Smith, P. O. Box 100, Magalia, Calif. [1954 list of native California woody material only, but collects other natives on request]
Red Cedar Wildflower Nursery, Falls Village, Conn. Ruth Hardy, Prop.
Lounsberry Gardens, Oakford, Ill.
Edmond Riggs, St. Martinsville, La. [mostly Louisiana iris]
Garden in the Woods, South Sudbury, Mass. Will C. Curtis, Prop. [not primarily a mail-order business, but nursery-grown native plants are a specialty]
*Johnson's Nurseries, College Highway, Southwick, Mass. [successor to Gillett Fern & Flower Farm, as of 1947]
Village Hill Nursery, Williamsburg, Mass. Miss Dorcas Brigham, Prop.
*American Perennial Gardens, P. O. Box 37, Garden City, Mich. [formerly Valley Gardens]
*Frank H. Rose, 1020 Poplar St., Missoula, Mont. [long a collector of native material from wild habitats]
*Isaac Langley Williams, P. O. Box 352, Exeter, N. H.
*David E. Burns, Barrington, N. J. [seeds only]
*Gardens of the Blue Ridge, Ashford (McDowell Co.), N. C. E. C. Robbins, Prop.
*The Three Laurels, Marshall (Madison Co.), N. C.
*Hugh Barclay, Narberth, Pa. Hansen Bros., Props.
*Vicks Wild Gardens, Conshohocken State Rd., Gladwyne, Pa. [formerly at Narberth, Pa.]
*Wake Robin Farm, Home, Pa. James Loder Park, Mgr.
*Claude A. Barr, Prairie Gem Ranch, Smithwick, S. D. [long a collector of native plants from wild habitats]
*O. F. Garret, Ysleta, Texas
Gardenside Nurseries Inc., Shelburne, Vt.
Mitchell Nurseries, Barre, Vt. [specialists in rock-garden plants]
*Putney Nursery Co., Inc., Putney, Vt. [successor to Aiken Nursery Co.]
*Carl S. English, Jr., 8564 30th Ave. N. W., Seattle 7, Wash.
Brown Deer Nurseries, Holton & Hunkel Co., P. O. Box 1747, Milwaukee 1, Wis.
*Pavek Nurseries, White Lake, Wis. [plants and seeds]
*Terrell's Aquatic Farm and Nurseries, Oshkosh, Wis. [specialists in native aquatics, especially for wild bird and conservation use]

G. H. M. L.

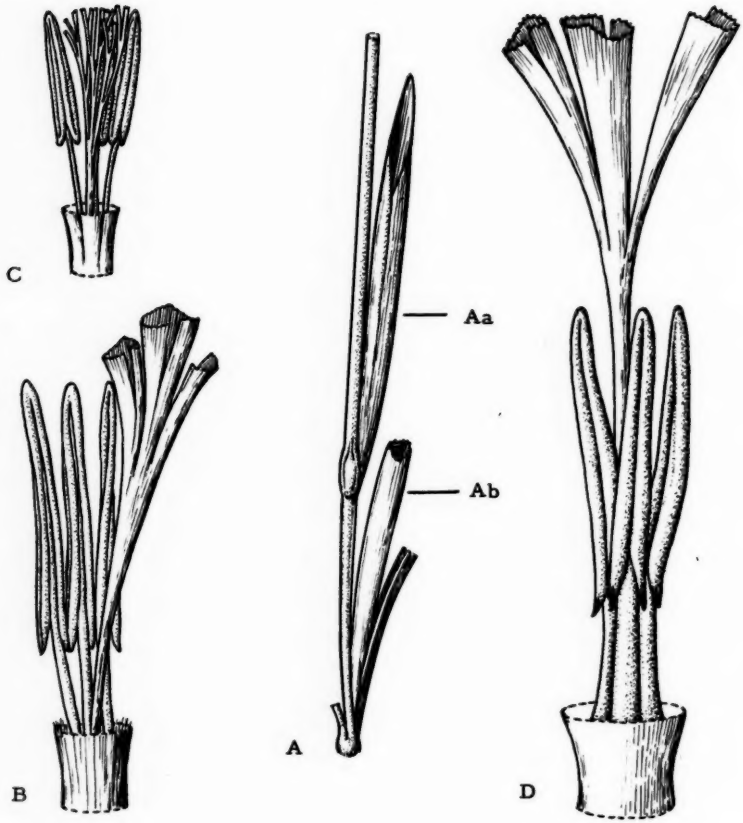


Fig. 38. A, Crocus vernus, scape and spathes x 4/5: Aa, the single proper spathe; Ab, the basal spathe (the ovary is situated just above the point of origin of the proper spathe). B, Crocus vernus, throat of perianth-tube with the 3 stamens and style and style-branches in relative positions, x 2. C, Crocus candidus, throat of perianth-tube with stamens and style-branches in relative positions, x 2. D, Crocus chrysanthus, throat of perianth-tube with stamens (note the black basal barbs of anther-sacs) and style-branches in relative positions, x 4. Redrawn from Maw, pls. 26, 54, 62

# Keys to Cultivated Plants
## 4. The Spring-flowering Crocuses

George H. M. Lawrence

The spring-flowering species of crocus are those flowering from January to May, depending on the species and the mildness of the climate. As pointed out previously[1], this grouping is artificial and, within the genus, there is a more or less continuous period of blooming from early September to early May. The number of December- and January-blooming species is few, but because some of those flowering in December may not flower until a month or more later in some snow-covered areas, there are a few names duplicated in this second "Baileya" article treating cultivated members of the genus.

The morphological features described and figured in the first article are equally pertinent to the species treated here, but only diagnostic features are figured for ease of reference. The key that follows is provisional. Readers making use of it will do a service in advising me of points where it lacks clarity or seems not to be accurate. Suggestions of other taxa to be included, especially varieties, are equally welcome. When using a key of this length, one should always compare both leads of the same number before deciding which of the alternative situations, or combination of situations, best matches the plant in hand. Whenever possible two or more sets of characters are contrasted. If a plant matches one character of a lead but not another, it may be necessary to key it out both ways and compare the unknown with a description of each taxon. Keys are man-made devices to enable one to determine the identity of a plant - and may not provide for the full range of variability if the species is polymorphic. For this reason, one should never be satisfied with the name "at the end of the key." Having this clue, one should then compare the plant with a description of the species whose name was reached with the key. In the case of Crocus, consultation should be made of one of the references cited at the end of this article. Each species included in the key will be treated in "Hortus III."

### Key to the Spring-flowering Species

1. Fls. yellow to brilliant orange within.
   2. Anthers more than 1 1/2 times as long as filaments; corolla-throat glabrous.
      3. Fls. globose, the segms. not flaring nor spreading wide-open.

4. Barbs of anther-base yellow; corm-tunic finely reticulate. . . . . 1. C. ancyrensis

4. Barbs of anther-base black; corm-tunic basally annulate.

5. Anther-sacs yellow to orange. . . . . 2. C. chrysanthus var. chrysanthus

5. Anther-sacs brownish-black. . . . . 3. C. chrysanthus var. fusco-tinctus

3. Fls. with spreading to flaring segms.; styles not exserted beyond the anthers.

6. Outer perianth-segms. yellow and not striped or veined, all brilliant orange within; style-branches deeply divided and seemingly 6 in number; filaments papillate. . . . . 4. C. Olivieri

6. Outer perianth-segms. brownish to purplish on outside; style-branches entire and 3 in number; filaments glabrous.

7. Fls. a clear, glossy lemon-yellow within; anthers 3 times as long as the filaments; style-branches orange-yellow; lvs. 12 or more at flowering-time. . . . . 5. C. Korolkowii

7. Fls. orange; anthers 2 times as long as the filaments; style-branches reddish-orange; lvs. usually 8 or less at flowering-time. . . . . 6. C. chrysanthus cls.

2. Anthers not much longer than filaments, or shorter; corolla-throat glabrous or bearded.

8. Style-branches not much exserted beyond anther-tips, paler-colored than the anthers; fls. with segms. flaring open but not commonly star-like; tunics splitting into parallel fibers.

9. The style-branches cream-colored, many and capillary; corm-tunic pale tan. . . . . 7. C. candidus var. Landerianus

9. The style-branches yellow, 3, with truncate, erose tips; corm-tunic reddish-brown. . . . . 8. C. flavus

8. Style-branches much exserted beyond anther-tips, mostly deeper-colored than anthers and often reddish; fls. wide-expanded and star-like.

10. Filaments papillose; perianth-segms. about 2.0 cm. long, rounded apically; style-branches 12 or more; tunics smooth and membranous. . . . . 9. C. Balansæ

10. Filaments smooth; perianth-segms. about 2.5-3.5 cm. long, acute; style-branches 3, truncate and erose; tunics reticulate.

11. Fls. pale yellow, outer perianth-segms. each with 5 feathery stripes; style pale orange. . . . . 10. C. stellaris

11. Fls. bright yellow, outer perianth-segms. chocolate-brownish; style orange-red. . . . . 11. C. angustifolius

1. Fls. white to lilac or purple.

12. Perianth-throat white or same color as segms.

13. Anthers twice as long as filaments.

14. Inner segms. feathered purple on outside. . . . . 12. C. versicolor

14. Inner segms. uniformly colored on outside.

15. Filaments white; outer segms. buff-colored, each with 3 purple stripes; style-branches red and fimbriate; corm-tunic coarsely reticulate. . . . . .13. C. corsicus

15. Filaments yellow; outer segms. lilac (may be striped purple); style-branches orange-yellow and entire; corm-tunic coarsely reticulate. . . . . .14. C. dalmaticus

13. Anthers not much longer than filaments, or shorter.

16. Perianth-throat bearded, at least at points of stamen-attachment.

17. Fls. lavender with white throat, the segms. acute, not striped. . . . . .15. C. Tomasinianus

17. Fls. white to lilac with white throat, the segms. obtuse, the outer ones often striped on outside.

18. Proper spathe (immediately beneath ovary) monophyllous; corm-tunic reticulate; stamen-filaments white.

19. Style-brs. overtopping anthers. . .16. C. vernus var. vernus

19. Style-brs. much shorter than stamens.

20. Fls. purple with white throat. . . . . .17. C. vernus var. neapolitanus

20. Fls. white with purple stripes. . . . . 18. C. vernus var. siculus

18. Proper spathe diphyllous; corm-tunic annulate, thick and hard; stamen-filaments yellow-orange.

21. Perianth white inside.

22. Outside of perianth slightly flecked purple. . . . . .19. C. biflorus var. albus

22. Outside of outer perianth-segms. buff-colored, each with 3 purple stripes. . . . . 20. C. biflorus var. Parkinsonii

21. Perianth silvery-white, suffused purple inside, the outer segms. boldly striped purple outside. . . . . 21. C. biflorus var. argenteus

16. Perianth-throat glabrous.

23. Throat of perianth white, the segms. white on both sides, the outer ones with 3 purple stripes. . . 22. C. Imperati var. albus

23. Throat of perianth of same color as segms., not white.

24. Anthers much shorter than filaments; style-branches not exserted beyond anther-tips; fls. white within, suffused very pale lilac; outer segms. buff-colored outside. . . . . 23. C. Cambessedesii

24. Anthers about equalling or longer than filaments; style-branches exserted beyond anther-tips; fls. violet to lilac-purple.

25. Corm-tunic of parallel fibers; stamen-filaments glabrous; outer segms. buff-colored outside.

26. Style-branches forked; perianth segms. 2.5-3.5 cm. long, acutish. . . . . 24. C. Imperati var. Imperati

26. Style-branches entire; perianth-segms. about 2 cm. long, obtuse. . . . . 25. C. minimus

25. Corm-tunic annulate, thick and hard; stamen-filaments papillose; outer segms. not buff-colored outside. . . 26. C. biflorus var. Adamicus

12. Perianth-throat yellow.

27. Style-branches much divided, the segms. capillary; anthers about as long as filaments.

28. Anthers brownish-black outside; plants flowering December to late January. . . . . 27. C. hyemalis

28. Anthers pale yellow to orange outside; plants flowering March to April.

29. Stigmas creamy-white; fls. vase-shaped, partially open; corm-tunic membranous, of parallel fibers, the corm whitish within; plants late-flowering..28. C.candidus var. candidus

29. Stigmas scarlet; fls. star-like, widely expanded; corm-tunic of fine, silky, closely woven fibers, the corm yellow within; plants early-flowering. . . . . 29. C. Fleischeri

27. Style-branches 3, entire or the truncate apices erose to shortly fimbriate; anthers longer than filaments.

30. Filaments papillose, only slightly shorter than anthers; corm-tunic hard and thick; outer perianth-segms. striped or feathered purple-crimson, the throat bearded. . . . . 30. C. biflorus var. biflorus

30. Filaments glabrous, half as long as anthers; corm-tunics thin; throat glabrous or usually so (sometimes sparsely pilose in C. Sieberi).

31. Stamens with white filaments; fls. becoming wide-open and star-like; inner perianth-segms. feathered purple. . . . . 31. C. versicolor

31. Stamens with yellow or orange filaments; fls. not star-like; inner perianth-segms. lacking darker veining.

32. Style-branches much exserted over anther-tips.

33. Corm-tunics annulate; anther bases with black barbs; perianth often suffused or streaked bluish to purplish. . . . . 32. C. chrysanthus

cls. 'Snow Bunting', 'Warley White', 'Blue Peter', etc.

33. Corm-tunics of membranous or parallel fibers; anther bases yellow.

34. Outer perianth-segms. buff-colored on outside.

35. Perianth-segms. lilac within, the outer with faint to dark purplish featherings outside, the inner segms. also veined light purple; style-brs. orange; corm-tunic coarsely reticulate. . . . . 33. C. etruscus

35. Perianth-segms. white within, the outer with 3 purple lines outside, the inner not veined purple on outside; style-brs. scarlet; tunic of parallel fibers. . . .34. C. Imperati var. montanus

34. Outer perianth-segms. in shades of lilac to purple, with darker veins or feathering on outside, the inner segms. not veined darker.

36. The outer perianth-segms. rounded apically; lvs. 3-4 to a tuft; style-branches orange. . . . . .35. C. Sieberi

36. The outer perianth-segms. acute; lvs. 4-6 to a tuft; style-branches yellow. . . . . .36. C. dalmaticus

32. Style-branch-tips below or scarcely higher than anther-tips; corm-tunics annulate and membranous.

37. Fls. globose in form, the outer segms. striped or feathered rich crimson to purple; style-branches about equalling the anther-tips. . . . . 37. C. aerius

37. Fls. more or less vase-shaped, not globose, the outer segms. not striped or feathered; style-branches extending to less than midway of anther height. . . . . 38. C. tauri

There are species-names of Crocus in the above key that doubtless are unfamiliar to many spring-bulb-enthusiasts. In view of these, explanations of some nomenclatural situations follow.

When E. A. Bowles rewrote his "Handbook of Crocus and Colchicum for Gardeners" prior to publication of the 2nd edition in 1952, he did so with the guidance and help of two well-known British botanists: B. L. Burtt, then at Kew and now at the Edinburgh Botanic Garden, and W. T. Stearn, then Librarian of the R. H. S. Lindley Library and now on the staff of the British Museum (Natural History). Mr. Bowles was an outstanding horticulturist, plant collector, and naturalist extraordinary (see "Baileya" 2: 67-68 for account of his death) but he would have been the first to disclaim himself a taxonomist. He followed his own judgment on when to accept and when to reject a name and, like many of us, was loathe to accept a change of any established name. A particularly knotty problem arose in the case of a few species of spring-flowering crocus, where it was clear that the names C. aureus, C. mæsiacus (also spelled moesiacus), and C. susianus were antedated by older names given them by Richard Weston in 1771. The names C. aureus and C. mæsiacus are synonyms of C. flavus Weston, while C. susianus is a synonym of C. angustifolius Weston.

Bowles dispatched Weston's valid name C. angustifolius with the somewhat less than accurate comment (p. 95), "An alternative name is C. angustifolius,'" and made no other reference to this name except to permit its inclusion in the index, under Crocus susianus, where appears the more accurate statement, "....a synonym of C. angustifolius." By a similar "closing of eyes" and index-reference, he dispatched the name C. flavus, the valid name of C. mæsiacus. However, Bowles included in his handbook a chap-

ter contributed by Burtt titled "Crocus vernus, the name and its history," in which Burtt clarified situations relating to these two species as well as to C. vernus and its allies. It is regretted that these nomenclatural findings were not adopted throughout the handbook for, it is feared, many users will be misled into retaining the incorrect names, as did Bowles, and into quoting Bowles as their authority for so doing.

In brief, the synonymy involved for these 2 species is as follows (adapted from that provided by Burtt):

Crocus flavus Weston, Universal Botanist 2: 237, 1771.

- C. sativus L. β vernus Linnæus, Species Plantarum 1: 36, 1753 [as concerns yellow-flowered taxa].
- C. vernus (L.) Wulfen in Jacquin, Flora Austriaca 5: 47, 1778 [as concerns yellow-flowered taxa].
- C. luteus Poiret in Lamarck, Encyclopédie Méthodique 6: 385, 1804.
- C. mæsiacus Ker-Gawler in Botanical Magazine 18: p. following tab. 652, 1803; and in General Indexes Bot. Mag. p. 22, 1805, in part.
- C. aureus Smith in Sibthorp and Smith, Flora Græca Prodromus p. 24, 1806; also Maw, Monograph of the Genus Crocus p. 271, 1886.
- C. lagenæflorus Salisb., Paradisus Londinensis t. 106, 1806.
- C. aureus var. luteus Bergmans, Vaste Planten ed. 2, p. 249, 1939.

C. angustifolius Weston, Universal Botanist 2: 238, 1771.

- C. vernus Miller, Gardener's Dictionary ed. 8, no. 3, 1768, not Hill 1765.
- C. susianus Ker-Gawler in Botanical Magazine 18: tab. 652, 1803.

These two orange-flowered species may easily be separated by noting the color of the styles and their length relative to that of the stamens, for in C. flavus (C. aureus, C. mæsiacus) the style-branches are yellow and are not extended to the tips of the anthers, while in C. angustifolius (C. susianus) the style-branches are orange-red and are exserted beyond the anthers with the stigmas clearly overtopping the latter.

Three polymorphic species of the spring-flowering group are C. biflorus, C. Imperati and C. vernus. Each is composed of botanical varieties (cultivated for the most part) with their own geographical ranges of distribution, and from each have been selected fancy-named cultivars and clones.

The Scotch Crocus, C. biflorus, was first given its Latin name by Philip Miller in 1768. It is presumed to have come into cultivation in Scotland early (Miller referred to it as "The Scots Crocus"

in 1731) and was distributed from there to Holland and England. In its typical form it is sterile, but populations from southeastern Europe, clearly belonging to it, and now treated as varieties of it, produce seed readily. Five of these botanical varieties are cultivated. Each is keyed out above, with the typical sterile element designated as C. biflorus var. biflorus. The other 4 varieties and their synonymy follow (the bracketed number after the valid varietal name is that used in the key above);

C. biflorus var. Adamicus (Herbert) Bowles, Handbook of Crocus and Colchicum for Gardeners, p. 117, 1952. [26]

C. Adamii J. Gay ex Ferussac in Bulletin des Sciences Naturelles 25: 219, 1831.

C. annulatus var. Adamicus Herbert, Crocorum Synopsis, in Botanical Magazine, ser. 2, 14: sub tab. 3861 and tab. 3868, 1841.

C. biflorus var. Adamii (J. Gay) Baker in Gardeners' Chronicle p. 434-435, 1873.

The rule of priority provides that, barring certain exceptions, the oldest epithet in the accepted category must be used. Here the category is that of variety and the oldest epithet in this category is Adamicus. Should evidence be put forth to raise the plant to the rank of species, its oldest epithet in that category is Adamii. This distinction may have been overlooked by some persons who followed Herbert and retained the epithet Adamii after the plant was reduced in rank to the status of a variety.

C. biflorus var. albus (Herbert) Hayek, Prodromus Floræ Peninsulare Balcanicæ 3: 115, 1933.

C. annulatus subvar. estriatus Herbert in Botanical Magazine, ser. 2, 14: sub t. 3862, 1841.

C. annulatus var. estriatus Herbert in Journal Horticultural Society London 2: 286, 1847.

C. annulatus var. albus Herbert in Journal Horticultural Society London 2: 286. 1847.

C. biflorus var. estriatus (Herbert) Maw in Gardeners' Chronicle, n. s. 16: 749, 1881. [The combination of C. biflorus var. estriatus Tchihatcheff of 1860 is a nomen nudum].

C. biflorus var. argenteus (Sabine) Baker in Gardeners' Chronicle p. 434, 1873. [21]

C. argenteus Sabine in Transactions Horticultural Society London 7: 455, 1830.

C. biflorus var. Parkinsonii Sabine in Transactions Horticultural Society London 7: 454, 1830. [20]

C. lineatus Jan, Elenchus Plantarum....p. 1, 1831.

C. annulatus var. lineatus (Jan) Herbert, Hist. Crocus sp. 37, p. 40.

Crocus Imperati is a species of southern Italy named by Tenore in 1826 in honor of Ferrante Imperato (1550-1625), an Italian botanist. It is a variable species but, aside from the typical element (var. Imperati ), only two varieties are known to be cultivated in America. The typical form has large flowers to 10 cm. across, whose outer segments are buff-colored outside (variously feathered and veined purple) and lilac within. There is no white or yellow throat. In var. montanus Herbert (var. albiflos Maw) the flower is pure white except for a bright orange throat and scarlet style-branches. The var. albus Herbert is completely white (lacking an orange throat) except for three purple stripes on the outer perianth-segments and orange style-branches.

There is abundant literature on the identity and nomenclature of Crocus vernus and its variations. Two botanical varieties are offered in the American trade and an abundance of fancy-named clones, usually under the group-name of Dutch Crocus. The typical form and vars. neapolitanus and siculus are contrasted in the above key. The nomenclature dealing with them is as follows (adapted from Burtt):

C. vernus (L.) Hill, Vegetable System 10: 1, 1765. [this is var. vernus] [No. 16 in key]

C. sativus α vernus Linnæus, Species Plantarum 1: 36, 1753.
C. cæruleus Weston, Universal Botanist 2: 237, 1771.
C. albiflorus Kitaibel ex Schultes, Oesterreiches Flora ed. 2, 1: 101, 1814.

C. vernus var. neapolitanus Ker-Gawl in Botanical Magazine 22: t. 860, 1805. [17]

C. purpureus Weston, Universal Botanist 2: 238, 1771.
C. napolitanus Loiseleur-Deslongchamps in Mordant de Launay, Herbier Général de l'Amateur 2: t. 101, 1817.
C. neapolitanus Ascherson ex Bergmans, Vaste Planten, ed. 2, p. 251, 1939.

C. vernus var. siculus (Tineo) Maw in Gardeners' Chronicle n. s. 16: 368, 1881. [18]

C. siculus Tineo in Gussone, Flore Siculæ.... Prodromus Supplementum 1: 7, 1832.

If the above 3 variants are to be considered separate species, rather than components of a single species, then the name C. vernus must be retained for the typical element, the name C. purpureus taken up for var. neapolitanus, and C. siculus for the last mentioned. Burtt (1952) held them to be 3 "microspecies." Because of the number of fancy-named clones that are not properly derivatives of any one variety, but are more likely a melange of infraspecific origin, it seems more realistic to treat these botanically distinct

variants as units of one species, C. vernus. It is this group of infraspecific origin to which Bergmans (1939) gave the name × C. cultorum.

Some of the spring-flowering species are less hardy than others and, as was done for the autumn-flowering kinds, those clearly belonging to a group of one extreme of hardiness or the other are so indicated below:

| The more hardy species | | Less hardy species |
|---|---|---|
| C. angustifolius | C. flavus | C. aerius |
| C. Balansæ | C. Fleischeri | C. ancyrensis |
| C. biflorus | C. Sieberi | C. Imperati |
| C. candidus | C. vernus | |
| C. etruscus | C. versicolor | |

A finding-list of names applied to the spring-flowering species grown in America is given below. Underscored names, followed by those of their authors, are valid and others are synonyms. Names of selected cultivars and clones believed to be among the more widely cultivated are included in the "Hortus III" treatment and are also given below with the species to which each belongs. Bracket numbers are of sequence position in the above key.

aerius Herbert [37]
albiflorus Kitaibel :: C. vernus var. vernus
ancyrensis (Herbert) Maw [1]
angustifolius Weston [11]
aureus J. Smith :: C. flavus
aureus var. luteus Bergmanns :: C. flavus
Balansæ J. Gay [9]
biflorus Miller
    var. Adamicus (Herbert) Bowles [26]
    var. Adamii (J. Gay) Baker :: var. Adamicus
    var. albus (Herbert) Hayek [19]
    var. argenteus (Sabine) Baker [21]
    var. biflorus [30]
    var. estriatus (Herbert) Maw :: var. albus
    var. Parkinsonii Sabine [20]
    var. pusillus (Tenore) Baker :: C. pusillus Tenore [not cult.]
cæruleus Weston :: C. vernus var. vernus
Cambessedesii J. Gay [23]
candidus E. D. Clarke
    var. candidus [28]
    var. Landerianus (Herbert) Bowles [7]
    cv. 'subflavus'

chrysanthus Herbert
    var. chrysanthus [2]
    var. fusco-tinctus Baker [3]
    clones [6, 31]
        clones of [6] include 'Bullfinch', 'E.A. Bowles', 'Golden Pheasant', 'John Hoog', 'Moonlight', 'Yellow Hammer', 'Zwanenburg Bronze'.
        clones of [32] include 'Snow Bunting', 'Warley White', 'Blue Peter'.
corsicus Vanucci [13]
dalmaticus Fisiani [14, 36]
etruscus Parlatore [33]
flavus Weston [8]
Fleischeri J. Gay [29]
hyemalis Boiss. & Blanche (see also "Baileya" 2: 82, 1954)
Imperati Tenore
    var. Imperati [24]
    var. albiflos Maw :: var. albus
    var. albus Herbert [22]
    var. montanus Herbert [34]
Korolkowii Maw & Regel [5]
luteus Lamarck :: C. flavus
mæsiacus Ker-Gawler :: C. flavus
minimus DeCandolle [25]
moesiacus Hort. :: C. flavus
napolitanus Loiseleur :: C. vernus var. neapolitanus
neapolitanus Bergmanns :: C. vernus var. neapolitanus
Olivieri J. Gay [4]
purpureus Weston :: C. vernus var. neapolitanus
pusillus Tenore [not cult.; material so listed is probably a variant of C. biflorus]
siculus Tineo :: C. vernus var. siculus
Sieberi J. Gay [35]
stellaris Haworth [10]
    cv. 'Pallidus'
susianus Ker-Gawler :: C. angustifolius
    var. ancyrensis (Herbert) Baker :: C. ancyrensis
tauri Maw [38]
Tomasinianus Herbert [15]
vernus Allioni :: C. vernus var. vernus
vernus Hill
    var. neapolitanus Ker-Gawler [17]
    var. siculus (Tineo) Maw [18]
    var. Tomasinianus (Herbert) Baker :: C. Tomasinianus
    var. vernus [16]
vernus Miller, not Hill :: C. angustifolius
versicolor Ker-Gawler [12, 31]
    Cl. 'Cloth of Silver'
    Cl. 'Picturatus'

References:

Baker, J. G. "Crocus" in Handbook of the Irideæ, pp. 76-95. London, 1892.
Bowles, E. A. A Handbook of Crocus and Colchicum for Gardeners, with a chapter on Nomenclature by B. L. Burtt. 222 pp., London, 1952.
Herbert, W. "Crocorum Synopsis," in Curtis' Botanical Magazine, ser. 2, vol. 14, under t. 3861 (April 1841), tt. 3862-68, 3870-71, 3873-75 (June 1841).
Herbert, W. "A History of the Species of Crocus," in Journal Horticultural Society of London 2: 249-293, 1847.
Maw, G. A Monograph of the Genus Crocus, with an Appendix on the Etymology of the words Crocus and Saffron by C. C. Lacaita. 326 pp., 67 col. pls. London, 1886.

## THE EARLY RISER SHOULD TRY SPHENOSTIGMA COELESTINA !

The southeastern United States is the home of a number of interesting, and often little-grown, members of the Iris family. Among these are the Celestial-lilies, most of which belong in the genus Nemastylis, but one does not. This one has been known to botanists for over 150 years. William Bartram discovered it in Florida in the 1770's and Willdenow, of Berlin, published for it the name Ixia coelestina in 1797. Later, John Belden Ker recognized it not to be an Ixia and placed it in Marica. Nuttall saw the error of this and transferred it to Nemastylis - each of these changes bringing it closer to what is believed to be its true position. J. K. Small of the New York Botanical Garden studied the Celestial-lilies in the field. He recognized Bartram's plant to be different in a number of features from the other species assigned to Nemastylis and, without making critical study of Mexican and South American irids, placed it in a new genus that he called Salpingostylis, and gave the plant the name Salpingostylis coelestina.

About a decade ago, Dr. Robert C. Foster of the Gray Herbarium, Harvard University, published an account of these taxa [Contributions Gray Herbarium 155: 9-17, 1945] and showed this Bartram species to be a northern representative of the generally more tropical American genus Sphenostigma. Its name is Sphenostigma coelestinum (Bartram) Foster. It differs from Nemastylis in that the 3 stamens are alternate with the 3 style-branches (opposite them in Nemastylis). It is a cormous plant growing 1.3-3.6 dm. tall, with 1-3 basal plicate leaves, and showy bluish-purple flowers, each with a white eye, and 5-8 cm. across. The flowers open early in the morning, closing by 8 A.M., and have a delicate fragrance. Seed has been offered by Rex Pearce of Moorestown, N.J., and corms by Wyndham Hayward of Winter Park, Fla.

G. H. M. L.

# Sinningia eumorpha and S. Maximiliana

Harold E. Moore, Jr.

Among the wild relatives of the "Gloxinia" or Sinningia speciosa are some attractive species frequently cultivated by gesneriad-fanciers. Most recent to reach the United States is a free-flowering species from the states of Santa Catarina and São Paulo in southern Brazil that has recently been described as Sinningia eumorpha.

Sinningia eumorpha had been cultivated at the Botanic Garden in São Paulo for a number of years before it was known here, having been brought there from the Serra de Botucatu in the southeastern part of São Paulo state. It had been considered the same as Sinningia Maximiliana Hanstein, a blue-violet-flowered species not certainly known in cultivation, with four or five glands in the disk, and it was under this name that a plant was illustrated in Hoehne, Kuhlmann and Handro's "O Jardim Botanico de São Paulo," t. 38A (1941). Mr. Harry Blossfeld of São Paulo grew similar plants from stock obtained in the state of Santa Catarina where it was cultivated by German settlers of the region.

When first offered in this country by Fantastic Gardens in 1951, the species was listed as S. Maximiliana and is grown as such by a number of gardeners. Examination of plants sent by Mrs. Peggie Schulz for the living collections at Cornell University showed that this was not S. Maximiliana but a related species that differed in having white flowers and only two well-developed glands in the disk.

Search for a name revealed that the species had not been described previously and because of its attractive flowers and habit, the name Sinningia eumorpha (the comely Sinningia) was provided for it in "Gentes Herbarum" 8: 390 (1954).

The accompanying figure (fig. 39), reproduced from "Gentes Herbarum," gives habit and details for comparison with other species. Although it might be confused with white forms of Sinningia speciosa, S. eumorpha can be distinguished by the two rather than five glands in the disk, and by the narrow calyx-lobes lacking a long slender pointed tip.

Sinningia eumorpha is very similar to the wild forms of S. speciosa in general appearance, with short stems and large, glossy

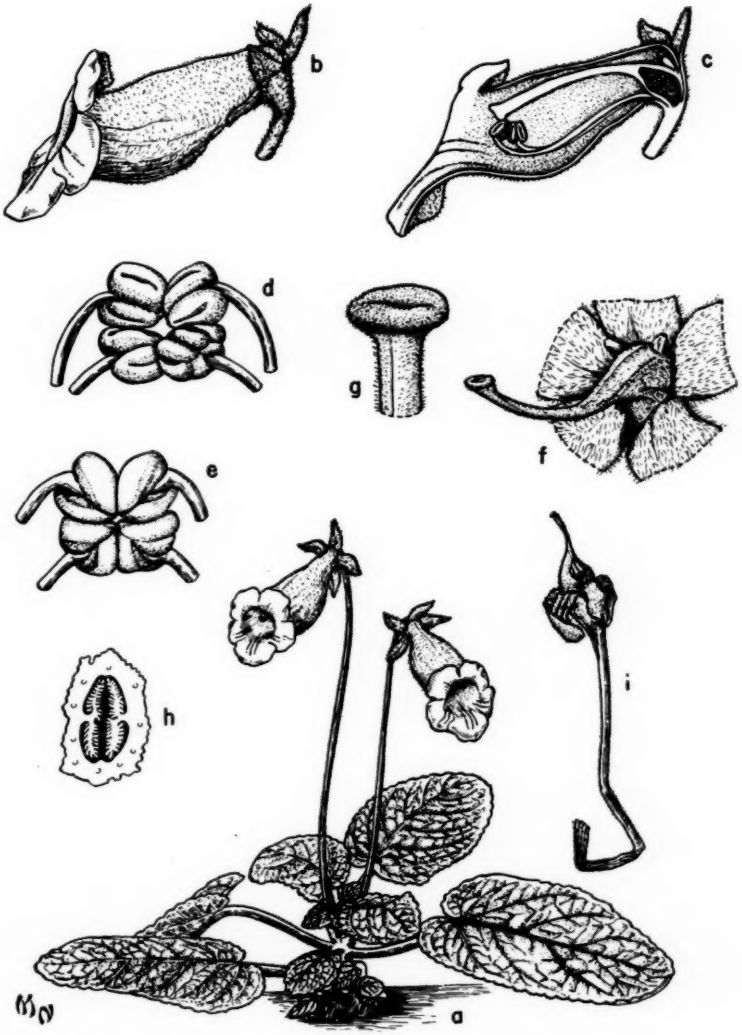


Fig. 39. Sinningia eumorpha; a, habit x 1/2; b, c, flower lateral view and vertical section x 1; d, e, anthers, ventral and dorsal views x 3; f, portion of gynoecium and disk-glands x 3; g, stigma x 6; h, ovary, cross-section x 4; i, capsule x 1.

green leaves covered with a fine, downy coat of short hairs. The blades are up to 13 cm. long and 8 cm. wide or even more in well-grown specimens. Flowers nod at the top of long slender peduncles that are borne singly or severally at intervals from the same leaf-axil. The calyx-tube is about 4 mm. long with spreading, ovate-lanceolate lobes up to 10 mm. long. The corolla is about 4 cm. long, milky white or faintly flushed with lavender and densely covered with fine hairs outside, lined with violet and yellow on the lower surface inside, the violet lines extending onto the three lower lobes or occasionally the flowers almost pure white. Instead of five glands in the disk, the two upper are well-developed and creamy-white, the three lower absent or minute. A dense cover of short red hairs on the upper portion of the ovary is distinctive.

## THE PRUNING MANUAL - A NEW BOOK

It is gratifying to know that some of the books written a half-century or so ago by L. H. Bailey are being continued in title and expanded in scope, although completely rewritten by new authors.

The "Pruning Manual" is one of these, written by Dr. Everett P. Christopher, head of the Department of Horticulture at the University of Rhode Island. Its Foreword, written in October, 1952, is among Dr. Bailey's last items of authorship.

The new book provides an analysis of the basic principles involved in pruning and general directions for pruning plants of such groups as fruit trees, grapes, small fruits, shade and ornamental trees, shrubs and vines, and roses. It is designed to meet the needs of the amateur and professional in all parts of the country.

While it is not the intent of this periodical to review regularly works of this nature, not dealing primarily with the kinds of plant materials, it is a pleasure in this instance to advise readers of this book - an example of continuation of a title made famous by our preceptor, L. H. Bailey.

[1]Christopher, E. P. The Pruning Manual. 320 pp., 53 figs. The Macmillan Company, New York, N. Y. 1954. $5.00.

## Classification, Distinct from Nomenclature

Recently, when advised that the new International Code of Nomen lature for Cultivated Plants was available, the author of one of our better books on garden plants was overheard to exclaim, "Oh good, now I can revise my book and be certain that the names in it will have stability!" It was an expression that caused me to realize how easy it is for anyone not to comprehend clearly the distinctions between identification, classification and nomenclature. It also made me realize that too often persons were damning nomenclature for name-changes brought about by honest differences of opinion on matters of identification and classification. Let me explain what I mean.

An unknown plant must be identified and classified before it can be named. Assume that you have been told correctly that your "unknown" is a Mountain-ash, and that you know it to be native in the Adirondack Mts. of New York. The plant is thus identified. The next step is to classify it. Let us look up Mountain-ash in the two most recent floras covering the region. In Fernald's "Gray's Manual of Botany" [1950] the tree is placed in the genus Pyrus. In Gleason's "New Britton and Brown Illustrated Flora" [1952] it is classified as belonging in the genus Sorbus. Here we find two competent authors disagreeing as to which genus is correct for the Mountain-ash. The matter is one of personal opinion. It is an open question whether the combination of characters

> 'leaves odd-pinnate, the cymes twice or more compound, the flowers with distinct (non-fused) styles, and the fruit berry-like and lacking stone- or grit-cells'

is adequate to separate the mountain-ashes from the common pear and its allies. Horticulturists, as well as botanists, are divided on the question. The evidence is inconclusive for either opinion. The preponderance of contemporary usage favors the separation of Sorbus as a genus distinct from Pyrus - an opinion to be followed, incidentally, in "Hortus III."

If one accepts Sorbus to be a valid genus, from the classification standpoint, the correct name for the Mountain-ash in question is Sorbus americana (that for the more commonly cultivated European Mountain-ash is Sorbus Aucuparia). If, however, one follows Fernald, the correct names for the same two species are Pyrus americana and Pyrus Aucuparia, respectively. This is an instance of two names for the same plant, the choice of which depends not on application of the International Code of Nomenclature, but on how one classified that plant.

Similarly, there are name changes for species, depending on whether an author considers the plant to be a distinct species, or only a variant of another species. It would have one name in the category of species, and another if treated as a variety of another species; again, a matter of opinion, not of rules of nomenclature.

G. H. M. L.

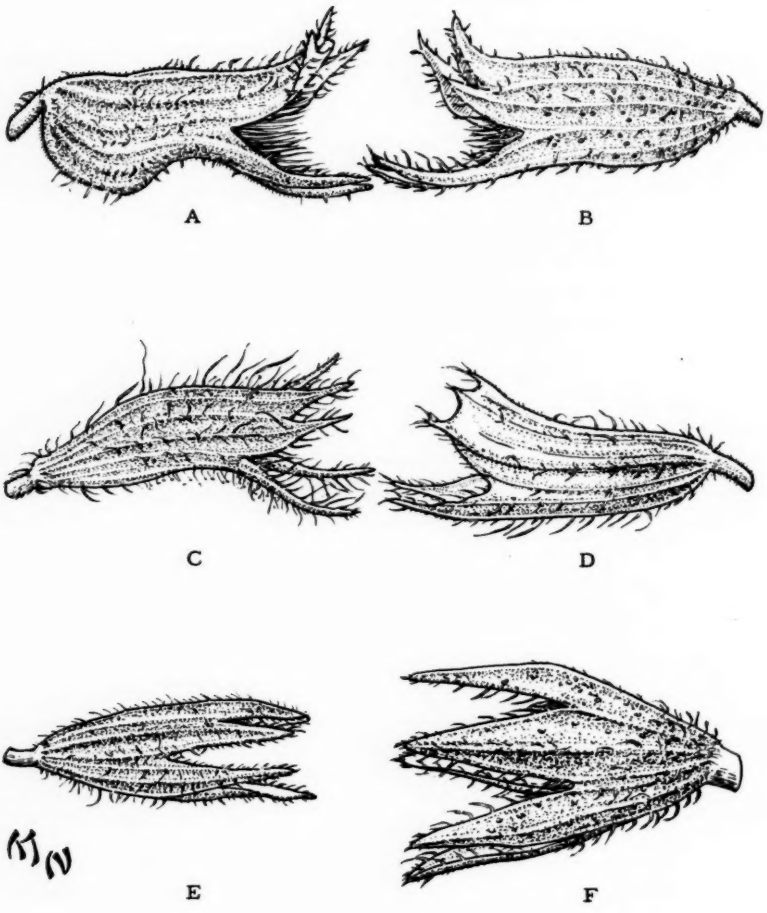


Fig. 40. Calyces typical of the genera: A, Acinos (A. arvensis) x 9; B, Calamintha (C. officinalis) x 9; C, Clinopodium (C. vulgare) x 5; D, Melissa (M. officinalis) x 5; E, Micromeria (M. Juliana) x 13; F, Satureja (S. hortensis) x 10.

# Notes on Cultivated Labiates
## 4. Satureja and Some Related Genera

Gordon P. DeWolf

Around Satureja there are clustered a number of taxa which have, in the past, had a very variable taxonomic treatment. It is not that the taxa are not distinct, or are difficult to identify - the problems are no more difficult here than in many other groups - it is simply that there is and has been difference of opinion as to the rank of the taxa involved. The treatment for "Hortus III" has necessarily not been monographic in scope. It follows what seems to be current opinion amongst students familiar with the plants in their native habitats, primarily in Europe.

Most of the genera treated below have at one time or another been included in Satureja. Current opinion, however, seems to be that there are various groups of species, united by structural characters of the calyx, and by habit, which are most conveniently treated as separate genera. The nomenclatural problems are probably as complex as any which have been heretofore mentioned in this series of articles. The discussion is included here to demonstrate the types of problems frequently encountered in determining the correct name for a given taxon.

Before going further, it will be wise, I think, to demonstrate in tabular form and by illustration the essential characters of the genera involved:

| Acinos | Calamintha | Clinopodium |
|---|---|---|
| (Fig. 40, A) | (Fig. 40, B) | (Fig. 40, C) |
| Calyx tubular, curved, gibbous (pouched at the base) | Calyx tubular, straight | Calyx tubular, curved |
| 13-nerved | 13-nerved | 13-nerved |
| Bilabiate | Bilabiate | Bilabiate |
| **Melissa** | **Micromeria** | **Satureja** |
| (Fig. 40, D) | (Fig. 40, E) | (Fig. 40, F) |
| Calyx campanulate, straight | Calyx campanulate or tubular | Calyx campanulate |
| 13-nerved | 13-15 nerved | 10-nerved |
| Bilabiate | Not bilabiate | Not bilabiate |

The nomenclatural treatment of these plants has been a problem since 1753. In that year, Linnæus distributed the species known to him through his genera Melissa, Satureja, Clinopodium, and Thymus. In the next year, 1754, Philip Miller, "Gardener to the Worshipful Company of Apothecaries, at their Botanic Garden, at Chelsea," published a 3-volume abridgement of the fourth edition of his "Gardeners Dictionary." This work does not use the Linnæan (binomial) nomenclature and therefore is not an acceptable source for species names, but names of genera published herein are legitimate. This is the place of first valid publication of the generic names Acinos and Calamintha.

In 1778 J. B. A. P. Monnet, Chevalier de la Marck (now usually written and referred to as Lamarck) published his "Flore Francaise." In this work, apparently independently of Miller, the name Calamintha was again proposed, and the name is frequently incorrectly credited to Lamarck. In 1794, Konrad Moench, in the "Methodus Plantas....describendi" (which we have mentioned in a preceding article), again apparently independently, proposed the names Acinos and Calamintha. These names are, however, illegitimate under the International Code since they are synonyms of Acinos Miller and Calamintha Miller.

In 1832-1836 Bentham, in the "Labiatarum Genera et Species," reduced Calamintha Moench, Acinos Moench, and Clinopodium Linnæus to the status of sections of Melissa Linnæus. He retained Satureja Linnæus in a restricted sense, and took up Micromeria, a genus he had previously proposed, to accommodate species which Linnæus and some subsequent authors had included in Thymus and Satureja.

In 1897 Briquet, in "Die Natürlichen Pflanzenfamilien," transferred Calamintha, Acinos, Clinopodium, and Micromeria, as well as some other genera, to Satureja. This left Melissa with three species, and enlarged Satureja to such an extent that it was almost indefinable. Of late years, however, there has been a tendency on the part of many workers to recognize as distinct the genera Acinos, Calamintha, Clinopodium, and Satureja, as defined by Moench, and Micromeria as defined by Bentham.

Turning now to the individual genera, and taking them in alphabetical order, we deal first with Acinos (fig. 41, A). This genus was set up by Miller in 1754 to accommodate two species which he lists as Acinos multis and Acini pulchra species (taken from the "Historia Plantarum Universalis" of Johannes Bauhin and Dominicus Chabræus of 1650-51), which Linnæus in the previous year had referred respectively to Thymus Acinos and T. alpinus. In 1778 Lamarck included these two species in his genus Calamintha, using the specific epithets arvensis and alpina respectively. Finally, in 1794, Moench placed the two species in Acinos again, using the epithets thymoides and alpinus.

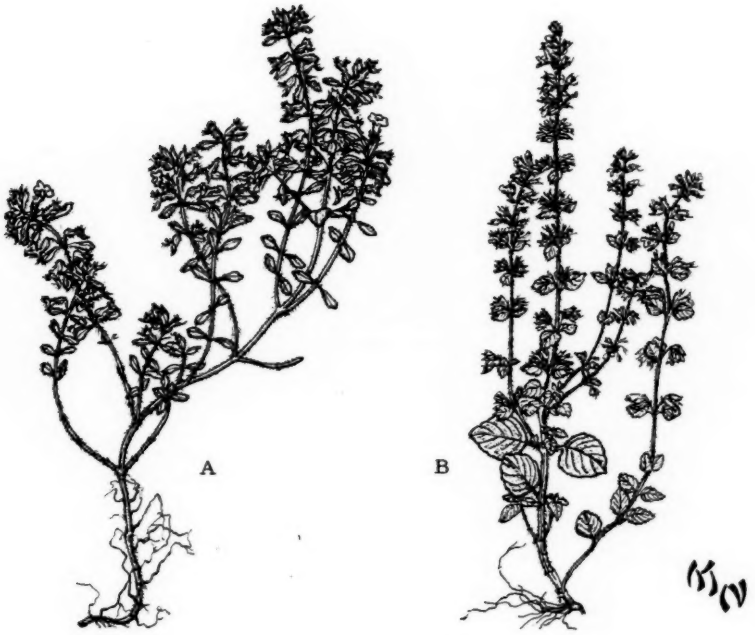


Fig. 41. A, Acinos arvensis x 4/5; B, Calamintha officinalis x 1/5.

Now, while we are obliged to take up Miller's generic names, we cannot take up his specific epithets. Under normal circumstances we would then take up the oldest legitimate specific epithets, which in this case are Acinos and alpinus of Linnæus, originally published under Thymus in the "Species Plantarum." In the case of alpinus this is what is done, and the correct citation is Acinos alpinus (L.) Moench, since it was Moench who first correctly combined Linnæus' epithet with the generic name Acinos. In the case of the specific epithet Acinos, however, this cannot be done, since the International Code of Botanical Nomenclature specifically states (Art. 79[3]), "Specific... epithets are illegitimate... when they exactly repeat the generic name... (tautonym)." Therefore, the next oldest specific epithet has to be taken up. In this case, it is Lamarck's epithet arvensis, since the Calamintha arvensis of the first edition of the "Flore Francaise" was based on the same pre-Linnæan taxon as was the Thymus Acinos of the "Species Plantarum." The correct combination in Acinos was not made, however, until 1946 when J. E. Dandy published it in "The Journal of Ecology" 33: 326, 1946.

Today there are perhaps seven species included in Acinos, but only two of these, and, interestingly enough, these the original two, seem to be in cultivation. The two species do not appear to be very different. Acinos alpinus is a perennial, with the corolla-tube two and a half times as long as the calyx, or longer. Acinos arvensis is an annual or short-lived perennial with the corolla-tube no more than twice as long as the calyx. The results of cytogenetic investigation would probably be of some interest here.

Calamintha (fig. 41, B) also is usually credited to Moench, or Lamarck, but is more properly credited to Philip Miller. It may seem strange that the same name has been used independently by different authors for the same or similar plants - actually, the explanation is quite simple. Both Acinos and Calamintha, like most other generic names used by Linnæus and other late 18th century botanists, were pre-Linnæan names. In 1694 Joseph Pitton de Tournefort published the first edition of his "Institutiones Rei Herbariæ" (second edition in 1700, third edition in 1719). In this work Tournefort grouped the plants known to his predecessors into genera as we understand them today. Linnæus took many of his generic names from Tournefort, and other botanists, such as Miller, Lamarck, and Moench, validated many more of Tournefort's names.

By international agreement among botanists, the year 1753, the date of publication of the "Species Plantarum" of Linnæus, is taken as a starting point for our modern plant nomenclature. Under the International Code of Botanical Nomenclature, a generic name is not considered to have been legitimately published unless it was taken up by Linnæus or a post-1753 botanist. A complication that further adds to the confusion is that until sometime after 1800 many botanists either did not have access to reasonably complete libraries, or did not choose to worry too much about what their contemporaries were doing. Hence we find that both Lamarck and Moench either ignored or, what is more likely, did not know of the work of Miller.

Today Calamintha is a genus of about 40 species. Of these, three are quite frequently cultivated. Calamintha grandiflora (L.) Moench is distinctive by virtue of its large (to 3.5 cm.) corollas of a deep lavender color. Calamintha Nepeta (L.) Savi and C. officinalis Moench may be distinguished from each other as follows:

| C. officinalis | C. Nepeta |
|---|---|
| Hairs in the throat of the calyx not exserted from the calyx-mouth after flowering | Hairs in the throat of the calyx distinctly exserted from the calyx-mouth after flowering |
| Corolla 14 - 20 mm. long | Corolla 10 - 14 mm. long |
| Largest leaves 2 - 4 cm. long | Largest leaves to 2 cm. long |

Another species, Calamintha coccinea (Nuttall) Bentham, the Clinopodium coccineum of J. K. Small's "Flora of the Southeastern United States," is a native of Florida, southern Georgia, and Alabama. This is a shrub to 1 meter tall, producing brilliant scarlet

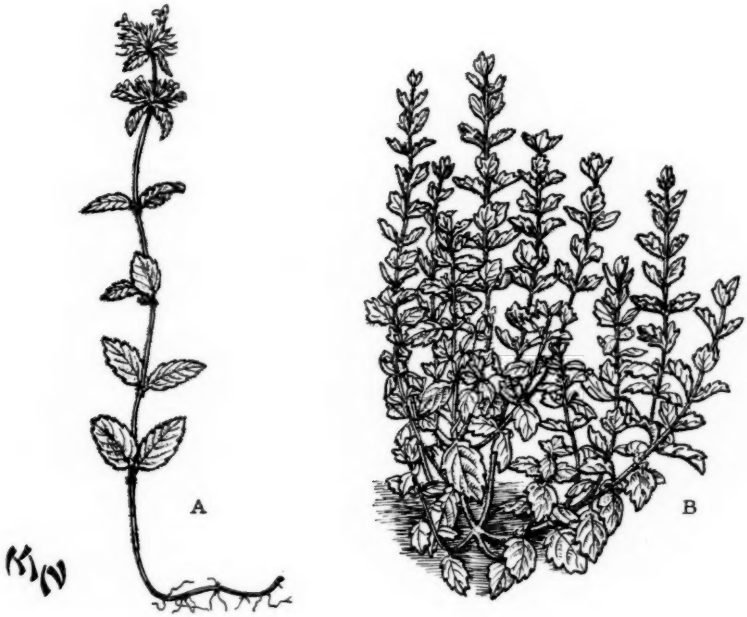


Fig. 42. A, Clinopodium vulgare x 1/3; B, Melissa officinalis x 1/8.

flowers throughout a good part of the year. While it does not seem to be offered now in this country, it was in cultivation in England as long ago as 1835 (under the name Gardoquia Hookeri). It seems a shame that such a showy shrub should not be in cultivation.

Clinopodium (fig. 42, A), apart from details of the calyx, is abundantly distinct from the other genera of the group by virtue of the dense, many-flowered verticils which make up the inflorescence. The only cultivated species which I retain in the genus is C. vulgare L. (Calamintha vulgare [L.] Druce; Calamintha Clinopodium Bentham). I have returned Clinopodium georgianum Harper to Calamintha caroliniana (Nuttall) Bentham, where I believe it more properly belongs.

Melissa (fig. 42, B), a genus of 3 or 4 species from the Mediterranean region, also seems to have but a single species in cultivation. This is M. officinalis L., the Lemon Balm. This was formerly, but is not now, official in the U. S. Pharmacopoea. It is cultivated as a sweet herb.

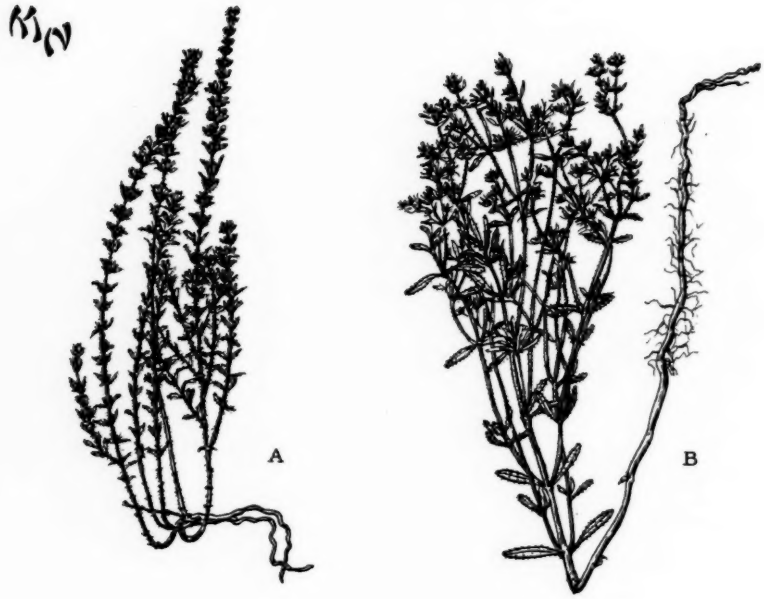


Fig. 43. A, Micromeria Juliana x 2/5; B, Satureja hortensis x 1/5.

Micromeria (fig. 43, A), a genus of about 70 species, is badly in need of critical study. As at present constituted, it contains species of diverse habit and disjunct range. The species are held together by the character of the non-bilabiate, tubular calyx. A number of species, among them the cultivated M. Juliana (L.) Bentham, bear some considerable resemblance in habit to the genus Thymus, from which they are readily separated by the nature of the calyx. In Thymus the calyx is strongly bilabiate (three teeth on the upper lip and two below), the upper teeth being more or less fused at the base and reflexed out of the plane of the tube, the lower lip consisting of two long, subulate teeth. The calyx in Micromeria, as noted above, is almost equally 5-toothed and not noticeably bilabiate.

The following key to the cultivated species of Micromeria is based on rather scanty material, but it is hoped that it will be of use to growers.

1. Leaves linear, or essentially so . . . . . M. Juliana
1. Leaves ovate.
  2. Fls. borne singly in the leaf-axils. . . . . M. Douglasii
  2. Fls. several in a verticil.
    3. Lvs. distinctly pubescent.
      4. Stems low and tufted, to 15 cm. tall. . . . . M. croatica
      4. Stems ascending, to 45 cm. tall.. . . . . M. dalmatica
    3. Lvs. glabrous or glabrescent.
      5. Stems prostrate. . . . . M. rupestris
      5. Stems ascending, tufted, to 15 cm. tall. . . . . M. Piperella

Finally, we come to Satureja (fig. 43, B) which, so far as cultivated material is concerned, I restrict to the Savories, S. hortensis L. the Summer Savory, and S. montana L. the Winter Savory. Satureja subspicata Visiani I consider to be referable to S. montana. The two species may be distinguished as follows:

| S. hortensis | S. montana |
|---|---|
| Annual | Perennial |
| Plant generally consisting of a single main axis, branching above, to 30 - 45 cm. tall | Plant consisting of a woody rootstock from which erect or ascending branches arise to 15 - 30 cm. |
| Internodes long | Internodes rather short |

The finding-list which follows will aid those interested in these cultivated labiates to refer the commonly used synonyms (under which plants may be grown or offered in the trade) to the proper valid names. The latter are underscored.

Acinos

alpinus (L.) Moench
arvensis (Lamarck) Dandy

Calamintha

annua Schrenck
caroliniana (Michaux) Nuttall
glabella (Michaux) Bentham
grandiflora (L.) Moench
Nepeta (L.) Savi
officinalis Moench

Clinopodium

chinense (Bentham) O. Kuntze
georgianum Harper :: Calamintha caroliniana
vulgare L.

Micromeria

Chamissonis (Bentham) Greene :: M. Douglasii
corsica :: hort. name of unknown botanical standing
croatica (Persoon) Schott
dalmatica Bentham
Douglasii Bentham
Juliana (L.) Bentham
Piperella (Allioni) Bentham
rupestris (Wulf ex Jacquin) Bentham

Satureja

Acinos (Clairville) Scheele :: Acinos arvensis
alpina (Lamarck) Scheele :: Acinos alpinus
Brauneana Javorka
Calamintha Scheele :: Calamintha officinalis
chinensis (Bentham) Briquet :: Clinopodium chinense
croatica (Persoon) Briquet :: Micromeria croatica (Persoon) Schott
glabella (Michaux) Briquet :: Calamintha glabella
glabra (Nuttall) Fernald :: Calamintha glabella var. angustifolia (Torrey) DeWolf [1]
grandiflora (Moench) Scheele :: Calamintha grandiflora
hortensis L.
intricata Lange :: S. montana, var.
Juliana L. :: Micromeria Juliana
montana L.
Nepeta (L.) Scheele :: Calamintha Nepeta
pygmæa Sieber ex Visiani :: S. montana
rupestris Wulf ex Jacquin :: Micromeria rupestris
subspicata Bartling ex Visiani :: S. montana
vulgaris Fritsch :: Clinopodium vulgare

[1] In the preparation of this finding-list for publication it was discovered that this combination apparently had never been made in Calamintha. Therefore, I am making the combination Calamintha glabella (Michaux) Bentham var. angustifolia (Torrey) DeWolf, based on the name Satureja glabella (Michaux) Briquet var. angustifolia (Torrey) Svenson (Rhodora 42: 7-8, 1940).

## FLOWER DETAILS BY PHOTOGRAPHY

An example of the expression, "nice things come in small packages, "is this book of 103 photographs by Noailles, "The Hidden Life of Flowers," depicting the stages in the life of a flower from the time the bud begins to burst until the seeds fall to the ground. The text (translated from the French) is by J. Guilcher and possesses that rare combination of a delightful style, easily read and comprehended, and scientific accuracy.

Despite the captivating simplicity of the prose, it is the illustrations that tell the story. The photographs are individually the work of an artist. Those showing magnifications of the inside of an ovary, of pollen grains, of types of hairs, excite the curious to wanting to examine these and other flowers, to see such wonders for themselves. On some pages, a vertical row of photographs is paralleled by a corresponding row of line sketches diagraming and labelling the parts shown in the photographs, a most useful device from the student's view, and one which gives point to an opinion long held by many scientists, that even the best photograph cannot always displace the illustrator's pen.

The book, octavo in size and only 93 pages in length, is printed on excellent paper. The illustrations are reproduced by the photogravure process. Plants whose floral details are displayed include the poppy, barberry, primrose, campion (Lychnis), maize, mallow, pine, and others. Scales of magnification are given in most instances and all illustrations are accurately captioned. The price, $4.75, is high, but not only is quality present throughout but a presentation of this type is not to be found in any other book known to this reviewer. The ardent plantsman will find it a conversation-piece for his friends, a source of lucid explanations of floral functions, and a delightful gift for the hard-to-please lover of flowers. For libraries and schools the book is a must.

G. H. M. L.

[1]Noailles, R. H. and Guilcher, J. M. The Hidden Life of Flowers. 93 pp., 103 photogravure illustrations. Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y. 1954.

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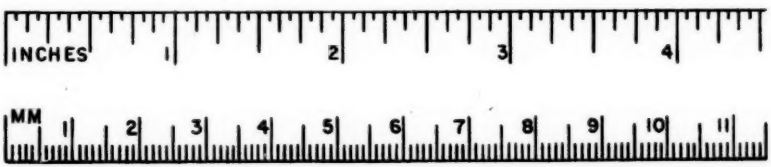
## ABBREVIATIONS USED IN BAILEYA

[Excluding abbreviations of author's names following binomials etc.]

| | | | | | |
|---|---|---|---|---|---|
| ann. | annual | dm. | decimeter | lf. | leaf |
| bien. | biennial | fl. | flower | lft. | leaflet |
| br. | branch | fls. | flowers | lvs. | leaves |
| brt. | branchlet | flt. | floret | mm. | millimeter |
| caps. | capsule | fr. | fruit | per. | perennial |
| cl. | clone | ft. | foot | segm. | segment |
| cm. | centimeter | hort. | horticultural | st. | stem |
| cv. | cultivar | in. | inch | sts. | stems |
| diam. | diameter | infl. | inflorescence | var. | variety |

## METRIC - ENGLISH EQUIVALENTS (approximate)

| | | |
|---|---|---|
| 6 mm. - 1/4 in. | 10 cm. - 4 in. | 10 mm. - 1 cm. |
| 12 mm. - 1/2 in. | 1 dm. - 4 in. | 10 cm. - 1 dm. |
| 25 mm. - 1 in. | 3 dm. - 1 ft. | 10 dm. - 1 meter |
| 2.5 cm. - 1 in. | 10 dm. - 1 yd. | |
| 5 cm. - 2 in. | 1 m. - 39 in. | |